Internet Access and Empowerment

A Community-based Health Initiative

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OBJECTIVE: **To determine whether access to health information via in-home Internet technology can positively influence empowerment among residents of a low-income urban community.**

DESIGN: **In-home Internet access and training were provided to volunteers, who, along with a comparison group, were interviewed prior to and 1 year after initiation of the program. Community-based participatory research methods were used to design and implement the intervention.**

SETTING: **A 57-block area on the West Side of Chicago.**

PATIENTS/PARTICIPANTS: **Twenty-five community residents completed all phases of the technology intervention. Thirty-five randomly selected neighbors of these residents served as the comparison group.**

INTERVENTIONS: **Members of the intervention group received Internet access via WebTV, training, technical support, and access to a community specific health-oriented web page during the course of the study.**

MEASUREMENTS AND MAIN RESULTS: **Intervention group members were similar to comparison group members in terms of empowerment at baseline. After receiving Internet access and training, empowerment related to health decision-making improved significantly in the intervention group. Similar changes did not occur in the comparison group. Affinity for and appreciation of information technology also increased in the intervention group but not in the comparison group. As a result, differences in attitudes toward technology increased between the 2 groups over time.**

CONCLUSIONS: **Using community-based participatory research methods, we found that Internet access to community-specific and general health information can lead to increased empowerment and appreciation of information technology. These benefits accrued among the intervention group but not among a random group of their neighbors.**

KEY WORDS: **community; participatory; health; empowerment; technology.**
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Healthy People 2010 states that "the greatest opportunities for reducing health disparities are in empowering individuals to make informed health care decisions and in promoting community-wide safety, education, and access to care."[1] Empowerment is a key principle in the fields of community psychology and public health. It can be measured at individual, organizational, or community levels. Individual or psychological empowerment refers to an individual's ability to make decisions and have control over his or her personal life[2] and is characterized by a sense of perceived control, competence, and goal internalization.[3–5] It combines personal efficacy and competence, a sense of mastery and control, and a process of participation to influence decisions and institutions.[2,6]

The goal of this study was to increase access to community-specific and general health information among residents of a low-income community via in-home Internet technology. The primary hypothesis was that such access would lead to increased empowerment regarding health-related issues. Previous studies have shown that access to health information can increase empowerment and improve health outcomes.[7–10] The secondary hypothesis was that, if given training and support, individuals who receive in-home Internet access can serve as opinion leaders, influencing attitudes toward technology and increasing empowerment among their neighbors. Diffusion of attitudes and skills can occur when opinion leaders are well integrated and respected within local networks.[11,12]

METHODS

Participants

Between 1999 and 2001, 60 community residents completed all phases of this study. Participants lived within a 57-block area of Chicago's Austin community, which has high rates of unemployment (17.4%), poverty (24.1%), and low birth weight (15.4%).[13] Members of the intervention group (n = 25) were recruited from a pool of residents who had previously served as block leaders. The block leaders or "citizen leaders" were typically long-time community residents who had participated in community improvement projects directed by the Westside Health Authority (WHA), a local community-based organization. Members of the comparison group (n = 35) lived on the same blocks as members of the intervention group. They were identified randomly using geographical stratification and recruited by research assistants via door-to-door canvassing. Table 1 shows a comparison of the groups.

Table 1. Demographic Characteristics of Citizen Leaders and their Neighbors

	Citizen Leaders		Neighbors	
	Baseline, % (*N* = 42)	Follow-up, % (*N* = 25)	Baseline, % (*N* = 93)	Follow-up, % (*N* = 35)
Female	74	80	74	83
Male	26	20	26	17
Age				
18–29	12	8	27	12
30–44	30	32	23	23
45–64	44	44	25	32
65+	14	16	24	33
Education completed				
Middle school	4	4	9	9
High school or some college	77	72	85	80
College	19	24	6	11
Years lived in neighborhood				
1–10	32	32	29	20
11–20	33	36	31	34
21+	31	32	40	46
Volunteered "a lot" in the community	56	52	20	19

Intervention

With funding from the federal Technology Opportunities Program and West Suburban Hospital, the intervention group (citizen leaders) received WebTV Internet access and training, a printer, and technical support from our staff. Citizen leaders were encouraged to communicate with each other via e-mail and to meet monthly at WHA. They also were encouraged to promote themselves, via window placards and block meetings, as health information resources for their neighbors. We developed a homepage with links to general and community-specific health care resources (www.ebvonline.org) to support them in this role. Informed by feedback from citizen leaders and other community residents, the homepage includes information regarding the location, hours of operation, and telephone numbers of local health care resources as well as answers to medical questions via e-mail ("Ask-A-Doc"), and links to information regarding substance abuse, grandparents raising grandchildren, housing resources, job opportunities, monthly area crime maps, and other resources important to community health.

Citizen leaders obtained health and safety information for themselves, their families, and their neighbors. We did not ask citizen leaders to allow neighbors into their homes. Rather, we asked them to provide printed information to their neighbors in response to information requests. Citizen leaders also were encouraged to direct their neighbors to 10 free Internet access sites established as a part of the intervention. Public sites included the local park district building, a grammar school, an alternative high school, the Westside Health Authority, and other community-based organizations. A complete description of the intervention is published elsewhere.[14,15]

Consistent with community-based participatory research, all aspects of our intervention were developed, implemented, and assessed in collaboration with community residents.[16–21] For example, the decision to partner with block leaders and provide them with Internet access and training was reached after discussions with community residents, WHA staff, and the block leaders themselves. An advisory board of local business owners, community residents, and community leaders was formed prior to implementation of the project. Members of the board stayed abreast of the project and provided advice on a regular basis. Our core research team included staff from WHA and 2 community residents who were trained as research assistants. This team met twice monthly at WHA to discuss feedback from project participants and ways to facilitate implementation of the program. Issues and ideas from these meetings were used to tailor the intervention and update the announcements, health content, and links of interest on the project homepage.

Evaluation Design

Community-based participatory research methods call for the continuous collection of information throughout the research process.[22–25] This information is used to shape and fit the intervention to the needs of the community. Evaluation thus becomes a process of self-determination and program improvement.[22] We collected data on both process and outcome measures. For process data, we documented WebTV usage and types of information sought by citizen leaders, their family members, and neighbors. For outcome data, we assessed empowerment and attitudes toward technology among citizen leaders and their neighbors at baseline and 1 year after the intervention. This study was reviewed and approved by the Institutional Review Boards from Loyola University Chicago and West Suburban Hospital. Researchers followed the ethical guidelines as specified in the American Psychological Association Publication Manual.[26] Informed consent was obtained for all questionnaires and instruments.

Survey/Instruments

During monthly telephone interviews, we asked citizen leaders to report how often they had used WebTV in the previous week, for what purpose, and who else had used the Internet access. Narratives regarding success in obtaining the desired information were termed "web stories." Citizen leaders also were queried regarding technical problems, and our staff provided troubleshooting advice and individual assistance when appropriate. To assess empowerment, we adapted Israel et al.'s Perceived Control Scale, which assesses empowerment at the individual, organizational, and community levels but does not address health-related empowerment.[2] Our 8-item adaptation assessed perceptions of control over decision making, personal influence within the community, and influence of the community on health-related issues. As with the Perceived Control Scale, our adaptation utilized a 4-point Likert metric ranging from 1 = strongly agree to 4 = strongly disagree. To assess information technology proficiency, aptitude, and acceptance, we constructed a 7-item instrument that also utilized a 4-point Likert scale. Assessments of empowerment and attitudes were performed in person at baseline and 1 year after implementation of the study.

Data Analytic Procedures

We performed content analysis of the web stories to classify types of information obtained by via the Internet. Outcome data from 25 citizen leaders and 35 neighbors were analyzed for differences between Time 1 (baseline) and Time 2 (1-year after the intervention) using a series of 2-tailed *t* tests in the STATA 7.0 program (Stata Corporation, College Station, Tex). We also utilized 2-tailed *t* tests to compare results between the 2 groups at Time 1 and Time 2.

RESULTS

Process Measures

Of the 42 intervention group members and 93 comparison group members initially identified, 25 (60%) and 35 (38%), respectively, completed the study. Citizen leaders reported accessing the Internet an average of 3 times a week. A total of 450 web stories were reported during the first year of the program. According to the citizen leaders, several groups were able to obtain information via WebTV. Those mentioned most frequently were the citizen leaders themselves (43%), family members (29%), neighbors (15%), and others (13%). Reasons cited for use of the Internet were for purchases (17%), networking (16%), entertainment (16%), health (14%), community events (13%), education (10%), employment (6%), safety (4%), and religion (4%). Table 2 illustrates examples of health-related web stories. Additional web stories are posted on the project homepage (www.ebvonline.org).

Outcome Measures

Compared to the neighbors we interviewed, citizen leaders reported significantly more agreement with only 1 statement from the empowerment questionnaire at baseline: "I believe people on my block appreciate me as an important person in this neighborhood" (Table 3). Among citizen leaders, agreement with 2 items (control over decisions that affect personal and family health, and satisfaction with influence over health decisions that affect the block) increased significantly between Time 1 and Time 2.

For the comparison group, 3 empowerment items changed significantly between Time 1 and Time 2. At Time 2, the comparison group reported significantly greater influence over their own neighbors' health decisions, and

Table 2. Examples of Internet Usage (Web Stories) as Reported by Citizen Leaders

Beneficiary	Web Story
Citizen leaders	"I was concerned about not feeling my baby moving so I looked up information about pregnancy on the web and I'm using 'Ask -A-Doc' regularly. I started a folder with information about having a healthy pregnancy."
	"I have diabetes and I was recently experiencing pain, so I went looking for some answers. I have also used WebTV to find health information on foot care."
	"I strained a muscle recently, so I found information on how to treat it."
Relatives	"A family member came by last week to use the WebTV and found useful information about weight control and asthma."
	"My grandson is on medication so I looked up information (side effects) about it for him."
	"I've used 'Ask-A-Doc' a few times for information for my mother. She wanted to know more about her medication and side effects."
Block neighbors	"My neighbor came and found some information and resources about alcohol and drug problems."
	"I used 'Ask-A-Doc' for my neighbor who had a lot of swelling and it turned out that there was fluid in her lungs and she was able to get medical attention."
	"A person on my block who is diabetic wanted a podiatrist so I looked on the web and found information for him."
Other community residents	"I found some recipes from the American Heart Association for the health fair."
	"I found health-related information and resources to distribute at the health fair I'm helping to organize."
	"There is a tabled Act in Congress for a diabetes program that I distributed information about [via WebTV] in my community and I was able to get 75 signatures."

Table 3. Means and Standard Deviations of Empowerment Among Citizen Leaders and Their Neighbors

	Time 1				Time 2			
	Citizen Leaders (*N* = 25)		Neighbors (*N* = 35)		Citizen Leaders (*N* = 25)		Neighbors (*N* = 35)	
Survey Item	Mean	SD	Mean	SD	Mean	SD	Mean	SD
I believe people on my block appreciate me as an important person in this neighborhood.	1.72	0.73	2.27*	0.67	1.64	0.56	2.39†	0.74
I can influence the decisions that my neighbors make regarding health issues.	2.08	0.75	2.41	0.56	1.96	0.67	1.73‡	0.56
I have control over decisions that affect my health and my family's health.	1.56	0.71	1.85	0.50	1.08§	0.27	1.82†	0.62
I am satisfied with the amount of control I have over decisions that affect my health and my family's health.	1.56	0.71	1.82	0.46	1.44	0.50	2.17†,‡	0.57
By working together, people on my block can influence decisions that affect our health.	1.88	0.60	2.15	0.51	1.68	0.47	2.63†,‡	0.89
My block has influence over health decisions that affect my life.	2.54	0.83	2.63	0.71	2.50	0.88	2.85	0.70
I am satisfied with the amount of influence I have over health decisions that affect my block.	2.70	0.70	2.53	0.72	2.13§	0.45	2.64†	0.68
People in my community work together to influence decisions in the city and state.	2.33	0.96	2.35	0.64	2.12	0.61	2.51†	0.70

1 = strongly agree, 2 = somewhat agree, 3 = somewhat disagree, 4 = strongly disagree.

* P < .05 for difference between citizen leaders and neighbors at Time 1.

† P < .05 for difference between citizen leaders and neighbors at Time 2.

‡ P < .05 for difference between neighbors at Time 1 and Time 2.

§ P < .05 for difference between citizen leaders at Time 1 and Time 2.

decreased control over decisions that affect their personal health and the health of their families. They also reported decreased agreement with the statement: "By working together, people on my block can influence decisions that affect our health."

While a difference in empowerment between the intervention and comparison groups was noted for only 1 item at Time 1, significant differences in empowerment were observed for 6 of the 8 items at Time 2. Compared to their neighbors at Time 2, citizen leaders reported greater agreement with statements regarding being appreciated on the block, control over decisions that affect personal and family health, satisfaction with control over health decisions, health benefits of collaborating with neighbors, influence over health decisions in the community, and collaboration to influence decisions at city and state levels (Table 3).

Technology aptitude, proficiency, and acceptance differed between the intervention group and the comparison group on 4 of the 8 items at baseline (Table 4). Compared to their neighbors at baseline, citizen leaders were more likely to report utilizing computers on a day-to-day basis, to perceive technology as a way to increase effectiveness, to use technology to find information for health improvement, and to feel comfortable working with new technology. At Time 2, citizen leaders reported a significant change related to their aptitude with computers, e-mail, and WebTV. No temporal changes in attitudes toward technology were noted among the comparison group. At Time 2, compared to the neighbors we interviewed, the intervention group reported greater proficiency with computers, e-mail, and WebTV, greater appreciation for technology as a tool to learn new skills, and greater satisfaction with information/knowledge about health resources.

DISCUSSION

Results from this study suggest that Internet access can positively influence health-related empowerment among those with in-home technology, but not among a random set of their neighbors. Baseline empowerment was similar between citizen leaders and their neighbors, differing on only 1 of 8 empowerment constructs. After 1 year, the intervention group differed from the comparison group on 6 of 8 empowerment constructs. The web stories we collected suggest that increased empowerment among citizen leaders may be due to increased access to health information and utilization of that information to address health concerns, including those related to pregnancy, medications, and management of chronic disease.

Community residents who received the intervention were also more comfortable with information technology at baseline compared to those in the comparison group. At 1 year, these differences were even more apparent. We believe this is due to the success citizen leaders experienced in obtaining information via the Internet. We found little evidence of diffusion of technology proficiency, aptitude, or acceptance from the intervention group to the neighbors we interviewed. On the other hand, citizen leaders reported their neighbors were the third largest

Table 4. Means and Standard Deviations of Attitudes Toward Technology Among Citizen Leaders and Their Neighbors

	Time 1				Time 2			
	Citizen Leaders (*N* = 25)		Neighbors (*N* = 35)		Citizen Leaders (*N* = 25)		Neighbors (*N* = 35)	
Survey Item	Mean	SD	Mean	SD	Mean	SD	Mean	SD
I don't have use for computers on a day-to-day basis.	2.88	1.09	2.38*	0.69	3.32	0.90	2.47†	0.74
Using technology to communicate with others can help me to be more effective in my neighborhood.	1.56	0.65	2.17*	0.57	1.32	0.55	2.29†	0.52
With the use of technology, I can find information to improve my health.	1.40	0.50	2.11*	0.64	1.44	0.82	2.05†	0.54
I am not the type of person to do well with computers, e-mail, and WebTV.	2.80	1.0	2.64	0.64	3.40‡	0.57	2.35†	0.73
I don't see how I can use technology to learn new skills.	3.12	1.01	3.02	0.52	3.48	0.58	2.85†	0.60
I feel comfortable with my ability to work with new technology.	1.52	0.65	2.09*	0.52	1.52	0.50	2.18†	0.63
I am satisfied with the information/knowledge I have about health resources.	2.04	0.84	2.20	0.47	1.76	0.72	2.29†	0.67

1 = strongly agree, 2 = somewhat agree, 3 = somewhat disagree, 4 = strongly disagree.

* $P < .05$ *for difference between citizen leaders and neighbors at Time 1.*

† $P < .05$ *for difference between citizen leaders and neighbors at Time 2.*

‡ $P < .05$ *for difference between citizen leaders at Time 1 and Time 2.*

group of beneficiaries of the program intervention. What explains this apparent inconsistency? We propose 2 explanations. First, the comparison group likely did not include the small group of neighbors who had regular contact with citizen leaders. While this small group of neighbors may have benefited from the Internet access on the block, most of the other neighbors probably did not. Second, we believe hands-on Internet access (afforded the citizen leaders but not their neighbors) may be required for changes in technology aptitude and acceptance.

Several caveats exist regarding this study. First, although 135 community residents were interviewed at baseline, only 25 citizen leaders and 35 neighbors completed the follow-up interviews. Reasons for lack of follow-up include dropping out of the program, losing telephone service, and our inability to contact study participants. Although we found differences in empowerment and attitudes over time between the intervention and comparison groups, the inclusion of follow-up data from all residents initially interviewed may have yielded different results. For example, the citizen leaders who were not interviewed at follow-up may have reported no change in empowerment or technology proficiency. Second, while a goal of this study was to identify an opinion leader effect, we interviewed only a small fraction of neighbors of those who received the intervention. The neighbors were randomly selected but were not characterized with respect to distance from the citizen leaders' homes. It is possible that an opinion leader effect exists but only among those with whom the citizen leaders regularly interact, such as family, friends, or nearby neighbors. In addition, the citizen leaders who completed the baseline and follow-up surveys differed from the comparison group in terms of educational attainment and history of volunteering in the community. These differences may have contributed significantly to the empowerment and attitudinal differences we noted over time. Also, the empowerment results should be interpreted with caution as our adaptation of Israel et al.'s Perceived Control Scale has not been tested for construct or content validity. Finally, while this study assessed empowerment and attitudes, it did not assess health behaviors or health. Further studies are needed to determine whether similar interventions can influence health outcomes.

This study has several implications in the areas of health and technology. First, at a time of rapidly increasing health care costs, this study showed that inexpensive in-home technology can be used to increase access to health information within a low-income community. Increased access appears to be associated with increased empowerment, a key element in improving quality and years of life and reducing health inequalities.[1] Second, this study suggests that while Internet access helped the intervention group, diffusion of these benefits was not widespread. Empowerment did not accrue and attitudes did not change among neighbors we interviewed, despite efforts to promote citizen leaders as information resources and the placement of public Internet access in 10 community locations. This suggests that diffusion of benefits related to Internet access may depend upon more complete distribution of this access (as with telephones), more widespread interaction between those who have access and those who do not, or a different group of opinion leaders. Finally, the web stories we collected suggest that many individuals from the target community used Internet-based information to address important health questions or manage chronic disease. Further studies are needed to determine whether the combination of empowerment and health information provided by this intervention can increase quality and

years of life or reduce health disparities. Community-based participatory research can help guide future studies by ensuring that technology-based health programs reflect community needs and priorities and leverage established community resources.

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